Ethernet to Serial & HID Keyboard Converter User Manual

Contents

SE100-U – USB Connector only

SE100-US - USB & DB9 Connector

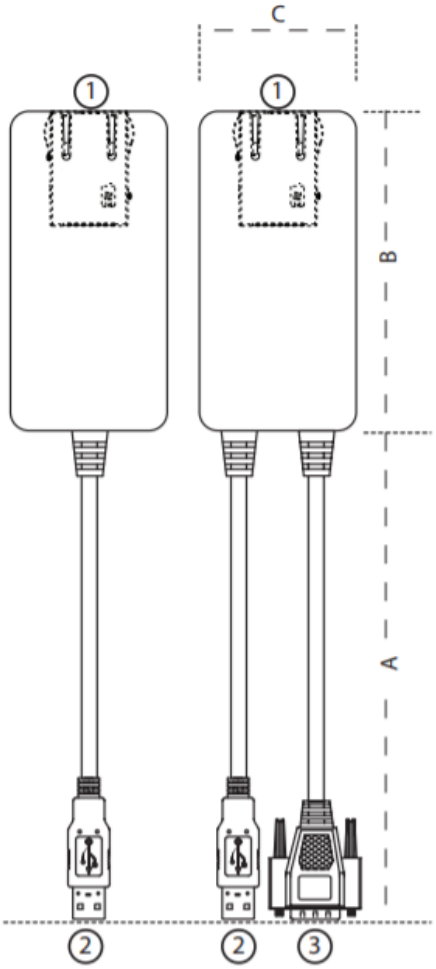
Introduction

This device converts TCP or UDP communication over an Ethernet port to HID keyboard emulation, USB COM port emulation or Serial RS232. This device comes in two setups, with USB port (SE100-U) or with USB port and a RS232 (DB9 connector) port (SE100-US). The USB port can emulate a Keyboard or a COM port.

Key Features

- RS232 baud rates of 2400 bps to 512,000 bps,
- USB port emulates either a HID keyboard or a COM port,
- Fall back IP address, which is the default for the static IP setting.
- Has several options for audible indicator of data transmission,
- Draws power from host PC through USB port, no external power supply needed,
- Ability to select keyboard language. Available languages English , Czech , French(France), French(Canada), German, Hungarian, Italian, Japanese (106/109 Keyboard) , Spanish and Swedish,
- Full implementation of HID Usage IDs of HID Code Page 7 in a Keyboard RAW mode
- Ability to disable and enable Web interface for Security purposes,
- Serial RS232 transmission buffer increased to 8kbytes.
- Ability to Query Keyboard Status Byte Settings

Technical specification



Part Number	SE100
Color	Black
Dimensions (L x W x H)	(A) 3.58 [345mm] (B) 3.15” [80mm] (C) 1.57” [40 mm]
Power	USB powered, no external power supply
Device Port Profile (1)	Ethernet Port (10/100 Mbps)
Host Port Profile (2)	USB port (emulating Keyboard or COM port)
Host Port Profile (3)	DB9 male connector (RS232)
Keyboard Layout Option	English (others available upon request)
Sound	86 dbA in 10cm
Operating temperature	0 °C to +50 °C
Storage temperature	-40 °C to +85 °C
Humidity	Non-condensing up to 85%

Default Factory Setting

Default Factory setting on the device is as follows:

- **System IP:** Dynamic DHCP
- **Fall Back IP Address:** 192.168.0.19
- **Network Service:** TCP Server
- **Web Interface:** Enabled
- **Local Port :** 4000
- **Remote Port:** 4001
- **Remote IP:** 0.0.0.0
- **Mode of Operation:** USB Keyboard Emulation
- **RS232 Baud Rate:** 115200
- **Sound :** Enabled
- **Beep Duration:** 100 ms
- **Keyboard Language:** English
- **Caps Lock Mode Switch:** Enabled

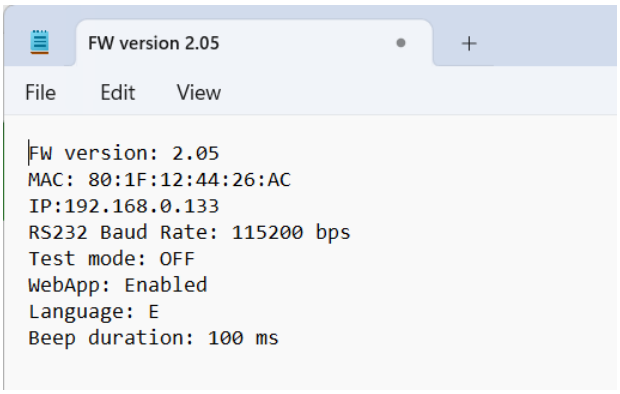
USB and Serial Communication Ports

- USB port with Keyboard emulation.
- USB port with COM port emulation.
- RS232 (DB9) COM port (available on SE100-US only).

USB Keyboard Emulation - Commands

Scroll Lock Key Press

User can check the current device settings, by pressing “SCROLL LOCK” key, at least 5 times on another keyboard connected the host computer. This feature is active for the first 20 seconds of device power up. The device will then output settings into the keyboard.



Screen shot to the left, shows the typical settings output of a device in USB Keyboard Emulation mode.

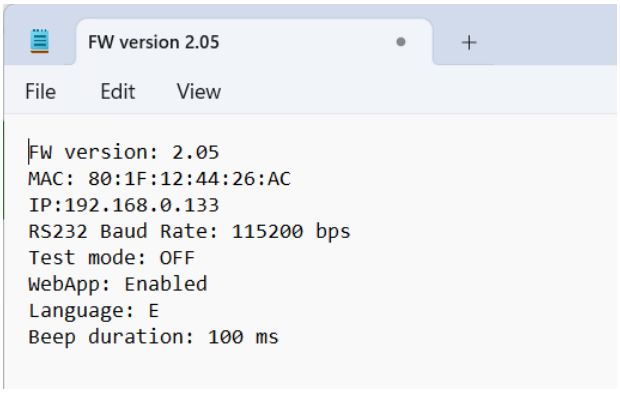
At start up in dynamic DHCP mode , if the unit can not find a DHCP server on the network , it switches to a fall back IP address which is the default for the static IP setting. Factory default for the fall back IP address is 192.168.0.19.

In this case, the IP settings for the SE100 will continue to operate in Dynamic mode. Therefore, as soon as it is plugged into a network that has a DHCP Server, the unit will acquire a dynamic IP

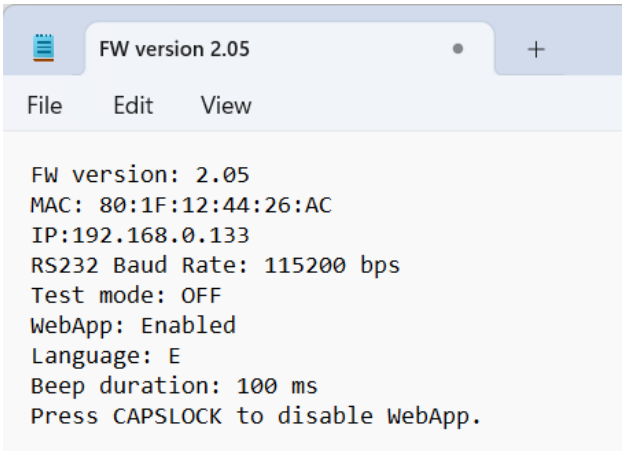
address. If you wish to keep the fall-back IP address as the default IP address of the unit, you should connect to the SE100 and set the IP Setting to static with the desired IP address saved in the settings.

Web interface disable/Enable

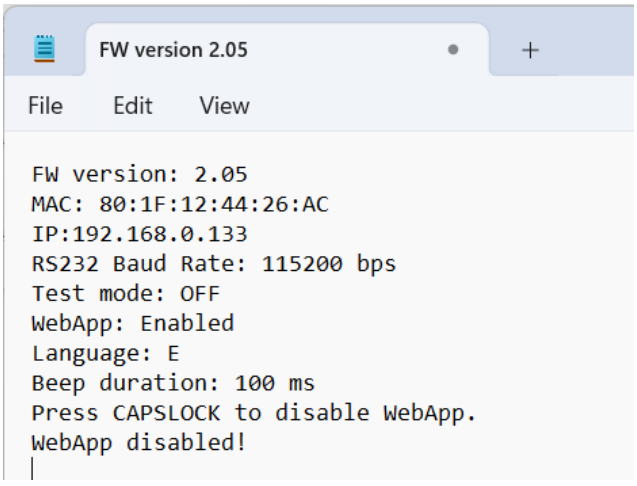
In HID Keyboard mode , with the first 20 seconds of device start up, press Scroll lock 5 times



In HID Keyboard mode , with the first 20 seconds of device start up, press Scroll lock 5 times and you will see the screen to the left:



then press scroll lock 5 more times and you will see the screen to the left, where the SE100 is asking you to press CAPSLOCK to Disable WebApp.



Pressing CAP Lock at this point will toggle Web interface Enable/Disable. You need to unplug and replug SE100 , for status change to take effect.

When trying to enable the WebApp, the system will ask the question twice.

At this point , CAP lock key press will no longer function for HID Mode switch to USB COM Port.

Caps Lock Mode Switch

User can easily switch from HID Keyboard mode to USB COM Port. In order to switch from HID keyboard to a COM port, user must press CAPS LOCK on the HOST keyboard at least 10 times. To switch from COM port emulation to HID keyboard, the user needs to send a command to the device using a serial terminal software. (see USB Com Port – Commands below).

Ability to switch mode by pressing CAPS LOCK can be controlled through a software setting as well. Furthermore, if the user presses scroll lock function at start up to get the device setting and continues to press Scroll lock to get to the web interface disable function, CAP lock key press will no longer function for HID Mode switch to USB COM Port.

USB Com Port and Serial RS232 – Commands

When device is in USB COM port or in Serial RS232 mode, it will listen to and accept commands within the first 20 seconds of start up. All the commands start with a preamble of "@@@" followed by lower case commands. If no commands are sent during the first 20 seconds, the USB COM port will exit command mode. When the device exits the command mode, any string starting with @@@ will be treated as a normal transmission string. Sending the serial commands requires a serial data terminal software. **The serial data terminal software must be capable of sending the linefeed<lf> character after the command string** (like HTerm software). While in USB COM Port or Serial RS232 mode, if a command followed by linefeed<lf> is sent to the device during the first 20 seconds of startup, the device will continue to operate in serial mode while listening and executing commands.

Get current setting

This command returns the current settings.

Command	Response
@@@gs	FW version: 2.05 MAC: 80:1F:12:44:26:AC IP:192.168.0.133 RS232 Baud Rate: 115200 bps Test mode: OFF WebApp: Enabled Language: E Beep duration: 100 ms

Disable/Enable Web interface

The following command disables the web interface. Sending the subsequent @@@save command is mandatory , if you want the device to save the new web interface status upon restart. The web interface disable will take effect upon hard restart of the device.

Command	Response
@@@ws0 @@@save	OK

The following command enables the web interface. Sending the subsequent @@@save command is mandatory, if you want the device to save the new web interface status upon restart. The web interface enable will take effect upon hard restart of the device.

Command	Response
@@@ws1 @@@save	OK

Switch to USB Keyboard Emulation

This command switches the USB profile from USB COM port mode or Serial RS232 mode to HID keyboard emulation.

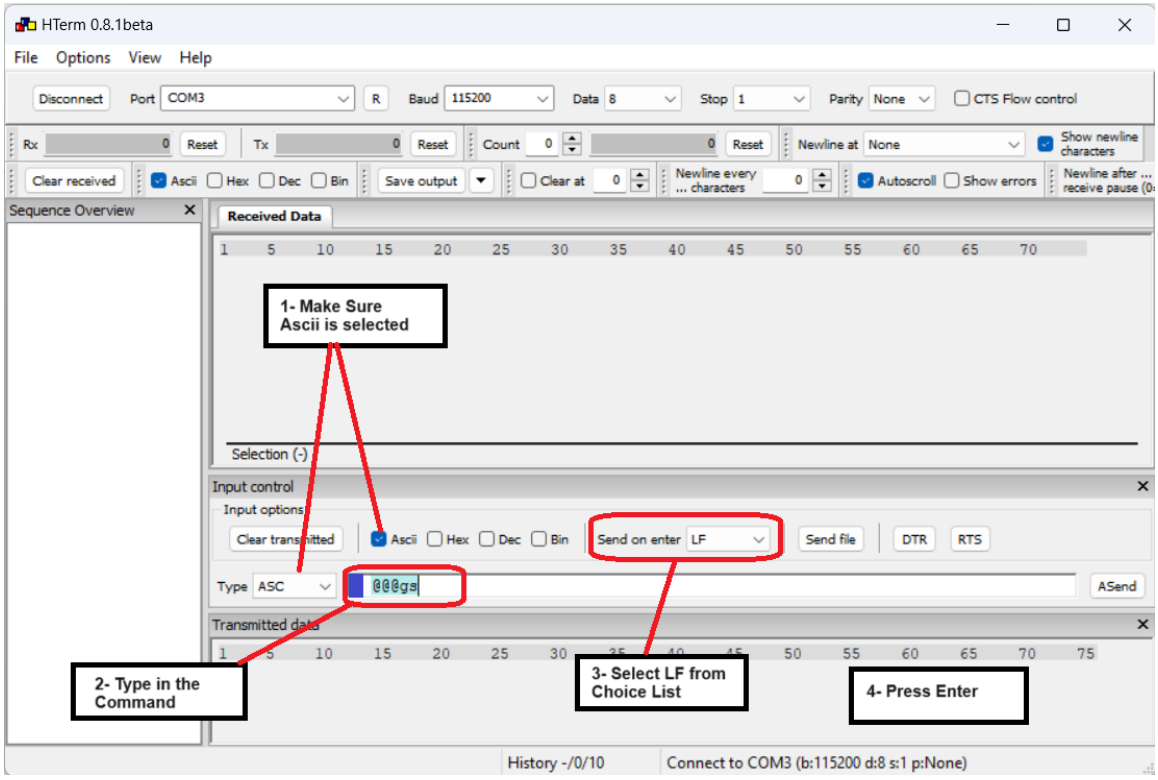
Command	Response
@@@hid	NA

Reset to Factory Default

This command resets the settings of the SE100 to Factory defaults stated on Page 4 of this manual. Sending this command will perform a restart of the device, for the settings to take effect.

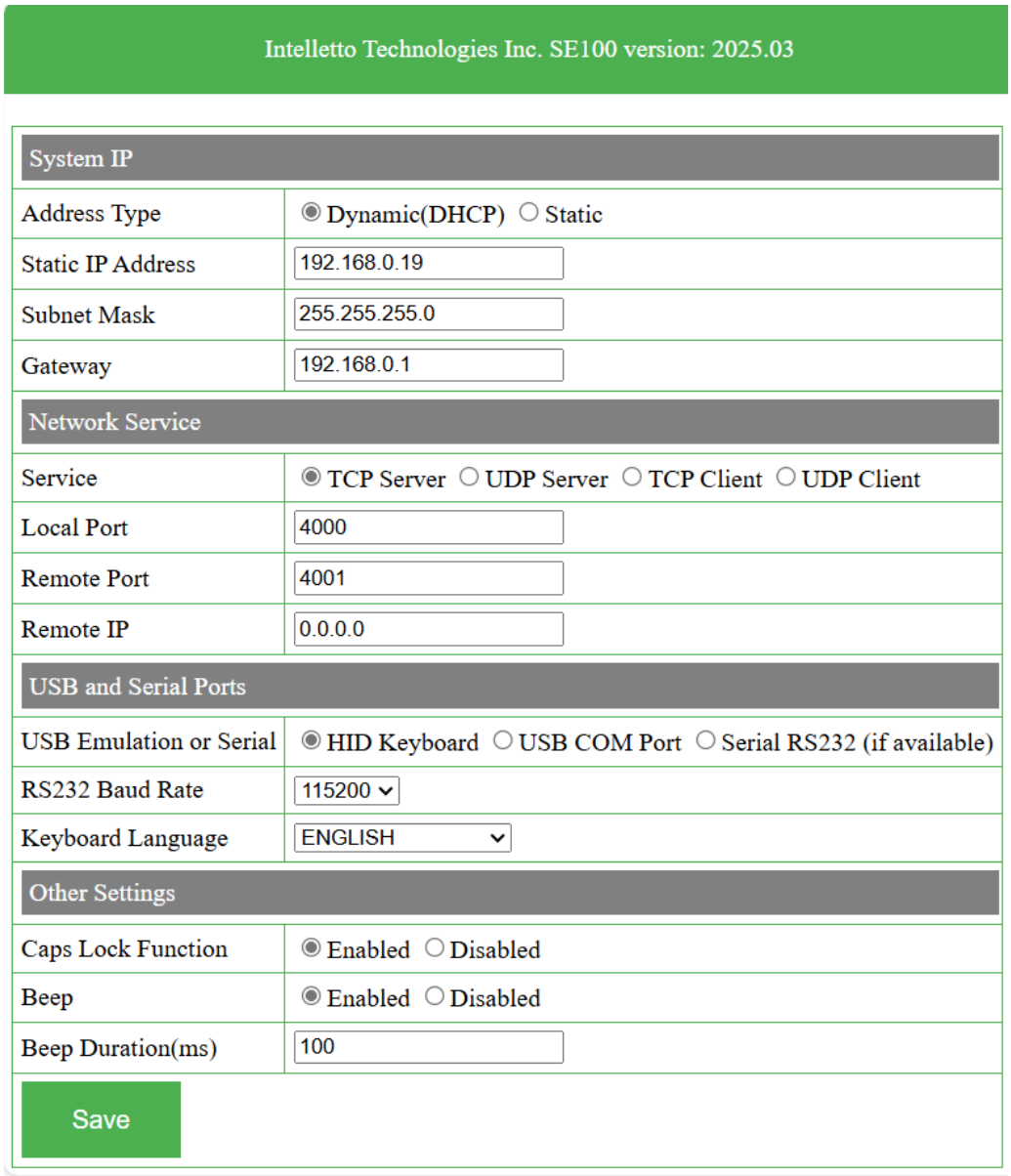
Command	Response
@@@reset	NA

How to use HTERM to send Serial Commands followed by linefeed<lf>.



Setup Through a Browser

Once you know the IP address of the device on your internal network, run a browser, key in the IP address in the browser, and press enter. You will see the following screen:



System IP: Set to either Dynamic (DHCP) or Static,
Network Services: Sets the operation mode of the Ethernet port,
USB and Serial: Sets the operation mode of the host port,
RS232 Baud Rate: Sets communication baud rate of the DB9 serial port on SE100-US,
Sound: Enable the beep sound signifying each string of data transmitted.
Caps Lock Function: Setting controls ability to switch mode by pressing CAPS LOCK.
Keyboard Language: Available languages are English , Czech , French(France), French(Canada), German, Hungarian, Italian, Japanese (106/109 Keyboard), Spanish and Swedish

Modes of operation

SE100-XX has four modes of operations in terms of IP protocols. It can act as a client or a server for both TCP and UDP protocols. Here is an overview of each mode and required settings.

TCP Server

Device acts as a TCP server listening to set local port. It Accepts up to 5 TCP client connections. Data sent on Serial Ports will be sent to all clients connected on set remote port. Data sent from connected clients will be routed to set USB or serial port.

USB and Serial Setting	Operation
USB COM Port	Bidirectional communication with Connecting Client.
DB9 COM port	Bidirectional communication with Connecting Client.
Keyboard Emulation	One way communication from with Connecting Client

IP Settings	Required	Description
Local Port	Yes	Client listens to this port. Sends data on this port
Remote Port	No	
Remote IP Address	No	

UDP Server

Device acts as a UDP server listening to the set local port. Data sent on active serial port will be sent to set remote IP address on remote UDP port. Data sent from UDP clients will be routed to set USB or serial port setting.

USB and Serial Setting	Operation
USB COM Port	Bidirectional communication only with Static IP **(*)**
DB9 COM port	Bidirectional communication only with Static IP **(*)**
Keyboard Emulation	One way communication from with Connecting Client **(*)**

IP Settings	Required	Description
Local Port	Yes	Listens to this port. Receives data on this port
Remote Port	Yes	Sends data to this port
Remote IP Address	Yes	Sends data to this IP address

(*) When communicating in UDP mode, if device is in Dynamic DHCP mode, the 4th byte of the IP address should be entered as .255 in the communicating software , otherwise transmission will fail. If the device is in Static address mode, the exact IP address of the device can be used. SE100 on Dynamic IP cannot send serial communication to a UDP client.

TCP Client

Device acts as a TCP client. It tries to connect to a set remote IP address on remote Port. Once connected data can be sent on active serial port. Data sent on active serial port will be sent to the set remote IP address on the set remote port. Data received on local port will be routed to set USB or serial port setting.

USB and Serial Setting	Operation
USB COM Port	Two way communication.
DB9 COM port	Two way communication.
Keyboard Emulation	One way communication.

IP Settings	Required	Description
Local Port	Yes	Listens to this port. Receives data on this port
Remote Port	Yes	Sends data to this port
Remote IP Address	Yes	Sends data to this IP address

UDP Client

Device acts as a UDP client. Data sent on active serial port will be sent to set remote IP address on remote UDP port.

USB and Serial Setting	Operation
USB COM Port	One way communication to connecting UDP software. **(+)**
DB9 COM port	One way communication to connecting UDP software. **(+)**
Keyboard Emulation	N/A

IP Settings	Required	Description
Local Port	N/A	
Remote Port	Yes	Sends data to this port
Remote IP Address	Yes	Sends data to this IP address

(+) When communicating in UDP mode, if device is in Dynamic DHCP mode, the 4th byte of the IP address should be entered as .255 in the communicating software, otherwise transmission will fail. If the device is in Static address mode, the exact IP address of the device can be used. SE100 on Dynamic IP cannot send serial communication to a UDP client.

Keyboard Raw Mode

Each Key press on a keyboard is represented by 8 bytes.

Byte 0: Keyboard modifier bits (SHIFT, ALT, CTRL etc)
Byte 1: reserved
Byte 2-7: Up to six keyboard usage indexes representing the keys that are currently "pressed".

Byte 0: Modifier Byte

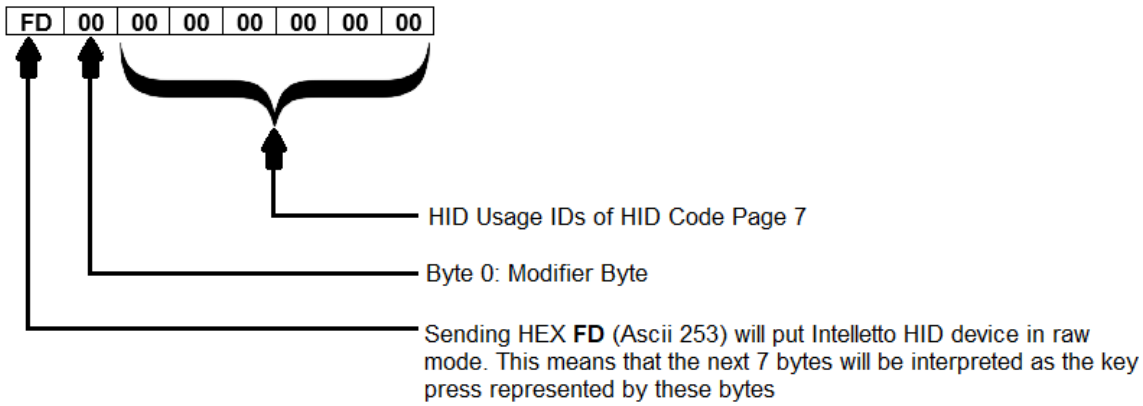
Modifier is constructed in the following bitwise format:

- Bit 0: Left CTRL
- Bit 1: Left SHIFT
- Bit 2: Left ALT
- Bit 3: Left GUI
- Bit 4: Right CTRL
- Bit 5: Right SHIFT
- Bit 6: Right ALT
- Bit 7: Right GUI

Byte 2-7: HID Usage IDs of HID Code Page 7

Bytes 2 to 7 are sent using HID Usage IDs of HID Code page 7 to represent all keys that are currently pressed.

In order to send a character in RAW format:



Raw Mode Examples

Send 'a'	**FD**	**00**	**04**	**00**	**00**	**00**	**00**	**00**
Send ‘A’	**FD**	**02**	**04**	**00**	**00**	**00**	**00**	**00**
Send ‘l’	**FD**	**00**	**0F**	**00**	**00**	**00**	**00**	**00**
Send ‘L’	**FD**	**02**	**0F**	**00**	**00**	**00**	**00**	**00**
Send RETURN	**FD**	**00**	**28**	**00**	**00**	**00**	**00**	**00**
Send ESCAPE	**FD**	**00**	**29**	**00**	**00**	**00**	**00**	**00**
Send DELETE (Backspace)	**FD**	**00**	**2A**	**00**	**00**	**00**	**00**	**00**
Send F1	**FD**	**00**	**3A**	**00**	**00**	**00**	**00**	**00**
Send Ctrl F1	**FD**	**01**	**3A**	**00**	**00**	**00**	**00**	**00**
Send Shift F1	**FD**	**02**	**3A**	**00**	**00**	**00**	**00**	**00**
Send Alt Shift F1	**FD**	**06**	**3A**	**00**	**00**	**00**	**00**	**00**
Send Ctrl Shift F1	**FD**	**03**	**3A**	**00**	**00**	**00**	**00**	**00**
Sends Alt 137 (ë)	**FD**	**04**	**59**	**5B**	**5F**	**00**	**00**	**00**
Sends Alt 0137 (‰)	**FD**	**04**	**62**	**59**	**5B**	**5F**	**00**	**00**

Please note:

- Send ALT keypad combinations require HID usage codes of Keypad numbers (0x59 to 0x62)
- Sending trailing zeros for the entire 6 bytes are mandatory

Refer to Appendix A for HID Usage IDs of HID Code Page 7

Query on Keyboard Status Byte

In HID Keyboard Mode, Sending 0XFF to SE100 through TCP or UDP will return keyboard status:

					Scroll Lock	CAP Lock	NUM Lock
0	0	0	0	0	X	X	X

Sample return values are:

- If SCROLL Lock, CAP Lock and NUM Lock are ON , Status byte returns as 00000111
- If SCROLL Lock OFF,CAP Lock OFF and NUM Lock OFF , Status byte returns as 00000000
- If SCROLL Lock OFF , CAP Lock ON and NUM Lock ON , Status byte returns as 00000011
- … etc ,

Appendix A: HID Usage IDs of HID Code Page 7

0x00	Reserved (no event indicated)	0x2C	Keyboard Spacebar	0x58	Keypad ENTER	0x84	Keyboard Locking Scroll Lock
0x01	Keyboard ErrorRollOver	0x2D	Keyboard - and (underscore)	0x59	Keypad 1 and End	0x85	Keypad Comma
0x02	Keyboard POSTFail	0x2E	Keyboard = and +	0x5A	Keypad 2 and Down Arrow	0x86	Keypad Equal Sign
0x03	Keyboard ErrorUndefined	0x2F	Keyboard [and {	0x5B	Keypad 3 and PageDn	0x87	Keyboard International1
0x04	Keyboard a and A	0x30	Keyboard] and }	0x5C	Keypad 4 and Left Arrow	0x88	Keyboard International2
0x05	Keyboard b and B	0x31	Keyboard \ and |	0x5D	Keypad 5	0x89	Keyboard International3
0x06	Keyboard c and C	0x32	Keyboard Non-US # and ~	0x5E	Keypad 6 and Right Arrow	0x8A	Keyboard International4
0x07	Keyboard d and D	0x33	Keyboard ; and :	0x5F	Keypad 7 and Home	0x8B	Keyboard International5
0x08	Keyboard e and E	0x34	Keyboard ' and "	0x60	Keypad 8 and Up Arrow	0x8C	Keyboard International6
0x09	Keyboard f and F	0x35	Keyboard Grave Accent and Tilde	0x61	Keypad 9 and PageUp	0x8D	Keyboard International7
0x0A	Keyboard g and G	0x36	Keyboard, and <	0x62	Keypad 0 and Insert	0x8E	Keyboard International8
0x0B	Keyboard h and H	0x37	Keyboard . and >	0x63	Keypad . and Delete	0x8F	Keyboard International9
0x0C	Keyboard i and I	0x38	Keyboard / and ?	0x64	Keyboard Non-US \ and |	0x90	Keyboard LANG1
0x0D	Keyboard j and J	0x39	Keyboard Caps Lock	0x65	Keyboard Application	0x91	Keyboard LANG2
0x0E	Keyboard k and K	0x3A	Keyboard F1	0x66	Keyboard Power	0x92	Keyboard LANG3
0x0F	Keyboard l and L	0x3B	Keyboard F2	0x67	Keypad =	0x93	Keyboard LANG4
0x10	Keyboard m and M	0x3C	Keyboard F3	0x68	Keyboard F13	0x94	Keyboard LANG5
0x11	Keyboard n and N	0x3D	Keyboard F4	0x69	Keyboard F14	0x95	Keyboard LANG6
0x12	Keyboard o and O	0x3E	Keyboard F5	0x6A	Keyboard F15	0x96	Keyboard LANG7
0x13	Keyboard p and P	0x3F	Keyboard F6	0x6B	Keyboard F16	0x97	Keyboard LANG8
0x14	Keyboard q and Q	0x40	Keyboard F7	0x6C	Keyboard F17	0x98	Keyboard LANG9
0x15	Keyboard r and R	0x41	Keyboard F8	0x6D	Keyboard F18	0x99	Keyboard Alternate Erase
0x16	Keyboard s and S	0x42	Keyboard F9	0x6E	Keyboard F19	0x9A	Keyboard SysReq/Attention
0x17	Keyboard t and T	0x43	Keyboard F10	0x6F	Keyboard F20	0x9B	Keyboard Cancel
0x18	Keyboard u and U	0x44	Keyboard F11	0x70	Keyboard F21	0x9C	Keyboard Clear
0x19	Keyboard v and V	0x45	Keyboard F12	0x71	Keyboard F22	0x9D	Keyboard Prior
0x1A	Keyboard w and W	0x46	Keyboard PrintScreen	0x72	Keyboard F23	0x9E	Keyboard Return
0x1B	Keyboard x and X	0x47	Keyboard Scroll Lock	0x73	Keyboard F24	0x9F	Keyboard Separator
0x1C	Keyboard y and Y	0x48	Keyboard Pause	0x74	Keyboard Execute	0xA0	Keyboard Out
0x1D	Keyboard z and Z	0x49	Keyboard Insert	0x75	Keyboard Help	0xA1	Keyboard Oper
0x1E	Keyboard 1 and !	0x4A	Keyboard Home	0x76	Keyboard Menu	0xA2	Keyboard Clear/Again
0x1F	Keyboard 2 and @	0x4B	Keyboard PageUp	0x77	Keyboard Select	0xA3	Keyboard CrSel/Props
0x20	Keyboard 3 and #	0x4C	Keyboard Delete Forward	0x78	Keyboard Stop	0xA4	Keyboard ExSel
0x21	Keyboard 4 and $	0x4D	Keyboard End	0x79	Keyboard Again	0xE0	Keyboard LeftControl
0x22	Keyboard 5 and %	0x4E	Keyboard PageDown	0x7A	Keyboard Undo	0xE1	Keyboard LeftShift
0x23	Keyboard 6 and ^	0x4F	Keyboard RightArrow	0x7B	Keyboard Cut	0xE2	Keyboard LeftAlt
0x24	Keyboard 7 and &	0x50	Keyboard LeftArrow	0x7C	Keyboard Copy	0xE3	Keyboard Left GUI
0x25	Keyboard 8 and *	0x51	Keyboard DownArrow	0x7D	Keyboard Paste	0xE4	Keyboard RightControl
0x26	Keyboard 9 and (	0x52	Keyboard UpArrow	0x7E	Keyboard Find	0xE5	Keyboard RightShift
0x27	Keyboard 0 and)	0x53	Keypad Num Lock and Clear	0x7F	Keyboard Mute	0xE6	Keyboard RightAlt
0x28	Keyboard Return (ENTER)	0x54	Keypad /	0x80	Keyboard Volume Up	0xE7	Keyboard Right GUI
0x29	Keyboard ESCAPE	0x55	Keypad *	0x81	Keyboard Volume Down		
0x2A	Keyboard DELETE (Backspace)	0x56	Keypad –	0x82	Keyboard Locking Caps Lock		
0x2B	Keyboard Tab	0x57	Keypad +	0x83	Keyboard Locking Num Lock		